

REMARKS

Claims 1-8 were rejected in an Office Action dated November 29, 2002. Support for the amendments may be found in the "Detailed Description of the Invention." Applicants respectfully request reconsideration of the present application in view of the following remarks.

I. The Claims Are Neither Disclosed Nor Suggested by the Cited

References

Claims 1-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Worden et al. (US 4,443,511). Applicants respectfully traverse this rejection.

Worden et al. teaches a waterproof and breathable elastomeric PTFE layered article which can exhibit elastomeric properties of stretch to break of 275% in the machine direction and 145% in the transverse direction and a total stretch recovery of at least 39% after being stretched to 75% extension for 100 cycles. The article can further be laminated to a stretch fabric to exhibit durability and possesses a moisture vapor transmission rate exceeding 1000 g/m²·day, and preferably above about 2000 g/m²·day.

It is stated in the Office Action that the contours of the hydrophobic film matrix are visible in Fig. 2(b) and 4(a) - (c) of Worden et al.. However, those figures, which are SEM photos, show only the surface "contour" of a continuous hydrophilic resin surface, which is clearly different from the contours of a porous PTFE membrane (for comparison of the contours, see, e.g., the node and fibril structure of an ePTFE membrane in Fig. 2(a) of Worden et al.). The hydrophilic resin layer surface of the layered structure of Worden, consisting of an ePTFE membrane and a hydrophilic resin layer, shown in Fig. 2(b) and 4(a) - (c), is substantially covered with the hydrophilic resin in an amount sufficiently thick to mask the contours of the ePTFE membrane. Therefore, said figures do not disclose or suggest the claimed structure of the composite membrane of the present invention.

Further, the specification of Worden et al. discloses no more than a general technique for coating a hydrophilic resin onto a hydrophobic porous membrane, and does not disclose or suggest the composite membrane of the present invention. Generally, in the absence of applicants' present teaching, when a hydrophilic resin is coated on a hydrophobic porous membrane, a significant quantity of hydrophilic resin remains on the surface of the hydrophobic porous membrane. The hydrophilic resin layer exposed on the surface of the

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hydrophobic porous membrane swells when it comes in contact with water, significantly losing mechanical strengths, such as abrasion resistance. Consequently, the hydrophilic resin layer becomes less durable to abrasion and flex, compromising its durable waterproofness.

In contrast to the teachings of Worden et al., only when the hydrophilic resin quantity that remains on the hydrophobic porous membrane surface is deliberately controlled, as specified in the present invention, is it possible to observe the claimed feature of the contours of said porous hydrophobic film matrix being visible through said hydrophilic resin coating layer over at least a portion of said hydrophilic resin coating layer. The present invention focuses on this unique feature which is neither disclosed nor suggested in Worden et al. Namely, the present invention relates to a composite membrane of 7 - 300 μm thick, consisting of a hydrophilic resin coated on one side of a hydrophobic porous membrane, where the hydrophilic resin coating is thin enough to make the contours of the structure of the hydrophobic porous membrane show through at least parts of the hydrophilic resin coating, when viewed with unaided eyes in a 10,000 times magnification SEM photo of the hydrophilic resin coating surface. The composite membrane with these features distributes/avoids the external stresses that otherwise compromise the waterproofness, by reducing the abrasion resistance of the coated surface of the composite membrane, consequently reducing the likelihood of suffering surface damage. The hydrophobic porous membrane structure of the present invention protects the hydrophilic resin from environmental and mechanical stresses over time, such as swelling with water. Thanks to these mechanisms, the present invention offers a waterproof, vapor permeable composite membrane and a waterproof, vapor permeable laminate sheet with high durability to various stresses, without compromising the water vapor permeability.

Considering the above, Claim 1 of the present invention is neither disclosed nor suggested by Worden et al., and is beyond any "obvious optimization to one of ordinary skill in the art," motivated by the teachings of Worden et al. Accordingly, applicants submit that the present invention is therefore patentable over the cited art.

Further, claims 2-8 are dependent claims from Claim 1, and, hence, are also patentable for the same reason cited above.

II. Conclusion

For the foregoing reasons, the present invention as defined by claims 1-8 is neither taught nor suggested by any of the references of record. Accordingly, applicants respectfully submit that these claims are now in form for allowance. If further questions remain, applicants request that the Examiner telephone applicants' undersigned representative before issuing a further Office Action.

Respectfully submitted,

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